

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Currently amended) A speech encoding method comprising:
generating an excitation signal using an adaptive ~~codebook storing~~ codebook,
which stores a past modified excitation signal, and a second codebook;
generating a synthesized speech signal using the excitation signal;
modifying the excitation signal ~~used to generate the synthesized speech signal~~
by filter processing that is executed by an excitation filter having low-pass
characteristics; and
storing the modified excitation signal in the adaptive codebook.

2. (Canceled)

3. (Original) A method according to claim 1, wherein the modifying step is performed by a recursive filter expressed by $R(z) = 1/(1 - k_1z^{-1})$ (k_1 : filter coefficient) in a z-transform domain.

4. (Canceled)

5. (Currently amended) A speech encoding method comprising:
~~generating an excitation signal by using a first code vector obtained from an~~
~~adaptive codebook storing a past excitation signal and a second code vector obtained~~
~~from another codebook;~~

selecting code information representing a first code vector by using the an
adaptive codebook so as to reduce perceptually weighted distortion between a target
vector obtained from an input speech signal and a synthesized vector ~~obtained from a~~
candidate vector of the first code vector;

selecting code information representing a second code vector from the a second
codebook so as to reduce perceptually weighted distortion of the a synthesized speech
signal;

generating an excitation signal by using the selected code information
representing the first and second code vectors;

modifying the generated excitation signal by filter processing which is executed
by an excitation filter having low-pass characteristics; and

storing the modified excitation signal in the adaptive codebook.

6. (Original) A method according to claim 5, wherein the modifying step is
performed by a recursive filter expressed by $R(z) = 1/(1 - k_1 z^{-1})$ (k_1 : filter coefficient) in
a z-transform domain.

7. (Canceled)

8. (Currently amended) A speech decoding method comprising:
generating an excitation signal using an adaptive codebook, which stores ~~storing~~
a past modified excitation signal, and a second codebook;
generating a synthesized speech signal using the excitation signal;
modifying the excitation signal ~~used to generate the synthesized speech signal~~
by filter processing which is executed by an excitation filter having low-pass
characteristics; and
storing the modified excitation signal in the adaptive codebook.

9. (Canceled)

10. (Original) A method according to claim 8, wherein the modifying step is
performed by a recursive filter expressed by $R(z) = 1/(1 - k_1z^{-1})$ (k_1 : filter coefficient) in
a z-transform domain.

11. (Canceled)

12. (Currently amended) An electronic apparatus comprising:
a speech encoder configured to execute the speech encoding method according
to claim 1; and
a speech input device configured to supply a speech signal to ~~said~~ the speech
encoder.

13. (Currently amended) An electronic apparatus comprising:
a speech decoder configured to execute the speech decoding method according to claim 8; and
a speech output device configured to output a speech signal from ~~said~~ the speech decoder.

14. (Currently amended) An electronic device comprising:
a speech encoder configured to execute the speech encoding method according to claim 1;
a speech decoder configured to execute a speech decoding method comprising:
generating an excitation signal using an adaptive ~~codebook storing~~
codebook, which stores a past modified excitation signal, and a second codebook;
generating a synthesized speech signal using the excitation signal;
~~modifying the excitation signal used to generate the synthesized speech~~
signal by filter processing which is executed by an excitation filter having low-pass
characteristics; and
storing the modified excitation signal in the adaptive codebook. [[:]]
~~a speech input device configured to supply a speech signal to said speech~~
~~encoder; and~~
~~a speech output device configured to output a speech signal from said speech~~
~~decoder.~~

15 - 17. (Canceled)

18. (Currently amended) A speech encoding apparatus comprising:
an adaptive codebook configured to store a past modified excitation signal;
a second codebook;

~~a synthesized speech signal generator configured to generate a synthesized~~
~~speech signal using an excitation signal generated by using said~~ the ~~adaptive codebook~~
and the second codebook; and

an excitation filter having low-pass characteristics configured to modify the
excitation signal by filter processing and ~~store~~ generate a modified excitation signal to
be stored in said the adaptive codebook.

19. (Currently amended) A speech encoding apparatus comprising:
a first codebook configured to store a past modified excitation signal and
generate a first code vector;

a second codebook configured to generate a second code vector;

a first code vector selector configured to select a code information vector
representing the first code vector ~~by using said~~ from the first codebook so as to reduce
perceptually weighted distortion between a target vector obtained from an input speech
signal and a synthesized vector obtained from a candidate vector of the first code
vector;

a second code vector selector configured to select a code information vector representing the second code vector from said the second codebook so as to reduce perceptually weighted distortion of a synthesized speech signal;

an excitation signal generator configured to generate an excitation signal ~~by-~~ using from the selected first and second code vectors; and

an excitation signal modifier having low-pass characteristics configured to modify the ~~generated~~ excitation signal by filter processing, and ~~store~~ generate a modified excitation signal to be stored in ~~said~~ the first codebook.

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20. (Currently amended) A speech decoding apparatus comprising:

an adaptive codebook configured to store a past modified excitation signal;

a second codebook;

a ~~synthesized speech~~ signal generator configured to generate a ~~synthesized speech signal~~ using an excitation signal generated by using said the adaptive codebook and the second codebook; and

an excitation filter having low-pass characteristics configured to modify the excitation signal by filter processing and ~~store~~ generate a modified excitation signal to be stored in ~~said the~~ adaptive codebook.

21. (Currently amended) An electronic apparatus comprising:

a speech encoder according to claim 18; and

a speech input device configured to supply a speech signal to ~~said the~~ speech encoder.

22. (Currently amended) An electronic apparatus comprising:
a speech decoder according to claim 20; and
a speech output device configured to output a speech signal from ~~said~~ the
speech decoder.

23. (Currently amended) An electronic device comprising:
a speech encoder according to claim 18;
a speech decoder comprising:
an adaptive codebook configured to store a past modified excitation
signal;
a second codebook;
~~a synthesized speech~~ signal generator configured to generate a-
~~synthesized speech~~ an excitation signal ~~using an excitation signal generated by using~~
~~said the~~ adaptive codebook and the second codebook; and
an excitation filter having low-pass characteristics configured to modify the
excitation signal by filter processing and ~~store~~ generate a modified excitation signal to
be stored in ~~said the~~ adaptive codebook;
a speech input device configured to supply a speech signal to ~~said the~~
speech encoder; and
a speech output device configured to output a speech signal from ~~said the~~
speech decoder.

24. (New) A method according to claim 1, wherein the excitation filter is a short-term excitation filter having low-pass characteristics.

25. (New) A method according to claim 1, wherein the second codebook stores a stochastic code vector.

26. (New) A method according to claim 5, wherein the excitation filter is a short-term excitation filter having low-pass characteristics.

A 27. (New) A method according to claim 8, wherein the excitation filter is a short-term excitation filter having low-pass characteristics.

28. (New) A method according to claim 8, wherein the second codebook stores a stochastic code vector.

29. (New) An electronic device according to claim 14, wherein the excitation filter is a short-term excitation filter having low-pass characteristics.

30. (New) A speech encoding apparatus according to claim 18, wherein the excitation filter is a short-term excitation filter having low-pass characteristics.

31. (New) A speech encoding apparatus according to claim 18,
wherein the adaptive codebook configured to generate an adaptive code vector; and
the second codebook configured to generate a stochastic vector.
